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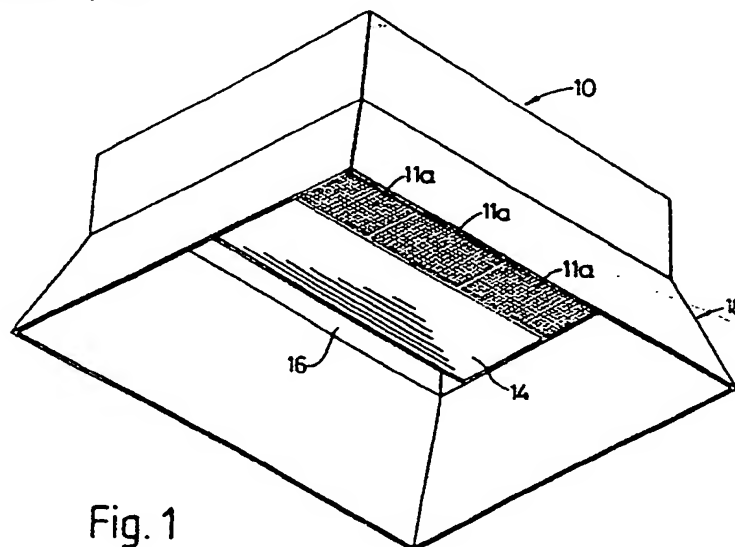
(71) Applicant: **AMBI-RAD LIMITED**  
**P.O. Box No. 30 Enfield Works Mucklow Hill**  
**Halesowen West Midlands B62 8DS(GB)**

(72) Inventor: **Fletcher, John Edward**  
**Burys Place**  
**Clifton-on-Teme Worcester(GB)**

(74) Representative: **Spruce, George Philip et al**  
**Shaw, Bowker & Folkes Whitehall Chambers**  
**23 Colmore Row**  
**Birmingham B3 2BL(GB)**

(54) **Space heating appliance.**

(57) Radiant plaque type space heater e.g. for over-head use includes generally conventional ceramic combustion panel assembly (11) and an adjoining secondary emitter panel (14) formed of ceramic fibre or other heat resistant material which has no provision for fuel feed thereto, at least some of the products of combustion and/or heated air from the combustion panel flowing across the front face of the secondary panel so that heat therefrom is absorbed by and radiated from the latter panel to supplement radiation from the combustion panel.



**Fig. 1**

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**EP 0 316 130 A1**

## SPACE HEATING APPLIANCE

This invention relates to space heating appliances of the kind in which a mix of fluid fuel, typically a gas fuel, and air is fed through a combustion panel, typically formed from a ceramic material, to burn at the face thereof so that radiant heat is emitted therefrom and said appliances are hereinafter referred to as "radiant plaque heaters".

The object of the invention is to provide a radiant plaque heater which is particularly efficient and economical in operation, of simple construction, and reliable, safe and durable in use.

According to the invention there is provided a radiant plaque heater including at least one secondary emitter panel in close proximity to the combustion panel and formed of a heat resistant material, said secondary panel having no provision for feed of gas fuel/air mix thereto but at least some of the products of combustion and/or heated air from the front of the combustion panel flowing across the front face of the secondary panel so that heat therefrom is absorbed by and radiated from the latter panel to supplement the radiation from the combustion panel.

The heater may further incorporate one or more reflector formations for direction of the radiant heat emitted by the panels.

Preferably the panels are so arranged and/or the heater is so mounted in use that the secondary emitter panel or panels receive convective upward flow of combustion products and/or heated air from the combustion panel.

The acting front face area of the secondary panel or panels may be substantially equal to or somewhat greater than the acting front face area of the associated combustion panel or panels.

A variety of materials may be used for forming the secondary panels, preferably a lightweight non-degradable porous, fibrous or cellular material is used. e.g. a ceramic material. Among such materials, suitable for this application, are ceramic fibers, mineral wools, calcium silicate, amorphous silica, insulating firebrick, and/or porous ceramic tile.

An example of the invention is now more particularly described with reference to the accompanying drawings wherein:

Figure 1 is a perspective view from below of an overhead radiant plaque heater, and

Figure 2 is a diagrammatic lateral cross-section of the heater.

The heater shown is for mounting overhead e.g. near ceiling level of a room to be heated and comprises a box-like casing which will be supported or suspended by mountings (not shown).

A downwardly facing combustion panel 11, in this example made up of three ceramic tile plaques 11a arranged side by side, occupies somewhat less than one half of the downwardly directed area of casing 10. Panel 11 is operatively fed with a mix of gas fuel and air from a mixing chamber 12 above panel 11 in known manner, combustion taking place at the exposed downwardly directed front faces of the plaque sections 11a so that radiant heat is emitted therefrom downwardly.

Immediately adjoining combustion panel 11 and occupying almost all the remaining downwardly directed area of casing 10 is a secondary emitter panel 14. The width of this panel is the same as or somewhat greater than the width of panel 11, preferably its exposed downwardly directed front area is at least equal to or up to one and a quarter times the exposed front face area of the combustion panel 11.

Along the side edge of panel 14 remote from the combustion panel is a longitudinal gap forming a flue duct 16 extending upwardly within casing 10.

An upwardly tapering rectangular reflector 18 is secured to the lower edges of the side walls of casing 10 so that it surrounds both panels 11 and 14 to assist in directing radiant heat downwardly from the heater.

When mounted in its position of use the substantially co-planar downwardly directed acting faces of the panels 11 and 14 are preferably slightly inclined to the horizontal e.g. by about 5 degrees so that the flue duct 16 is above the level of the side of panel 11 remote therefrom.

As combustion takes place at the exposed face of panel 11 heated air and the hot products of combustion pass across the exposed lower face of the emitter panel 14 in their upward convection flow to reach duct 16 through which they exhaust from the heater. During this flow heat is transferred to and absorbed by panel 14 and is emitted therefrom as radiant heat supplementing the heating effect of the combustion panel 11. In this way substantially increased efficiency is obtained and wastage of heat is substantially reduced.

In this example emitter panel 14 is formed from ceramic fibre though other materials as referred to above may be employed.

## Claims

1. A radiant plaque heater as hereinbefore defined characterised by at least one secondary emitter panel (14) in close proximity to the combustion panel (11) and formed of a heat resistant material,

said secondary panel having no provision for feed of gas fuel/air mix thereto but at least some of the products of combustion and/or heated air from the front of the combustion panel flowing across the front face of the secondary panel so that heat therefrom is absorbed by and radiated from the latter panel to supplement the radiation from the combustion panel. 5

2. A heater as in Claim 1 characterised by one or more reflector formations (18) for direction of radiant heat emitted by the panels in use. 10

3. A heater as in Claim 1 or 2 characterised in that the panels are so arranged that, with the heater mounted in its position of use, the secondary emitter panel or panels (14) receive convective upward flow of combustion products and/or heated air from the combustion panel (11). 15

4. A heater as in Claim 1, 2 or 3 characterised in that the acting front face area of the secondary panel or panels (14) is substantially equal to or greater than the acting front face area of the associated combustion panel (11). 20

5. A heater as in Claim 4 characterised in that said acting front face area of the secondary panel (14) is from one to one and a quarter times said acting front face area of the acting combustion panel (11). 25

6. A heater as in any preceding claim characterised by a flue duct (16) along the edge of the secondary emitter panel or panels (14) at the opposite side thereof to the combustion panel (11), heated air and products of combustion flowing upwardly across the front face of the secondary panel in use to reach the flue duct. 30

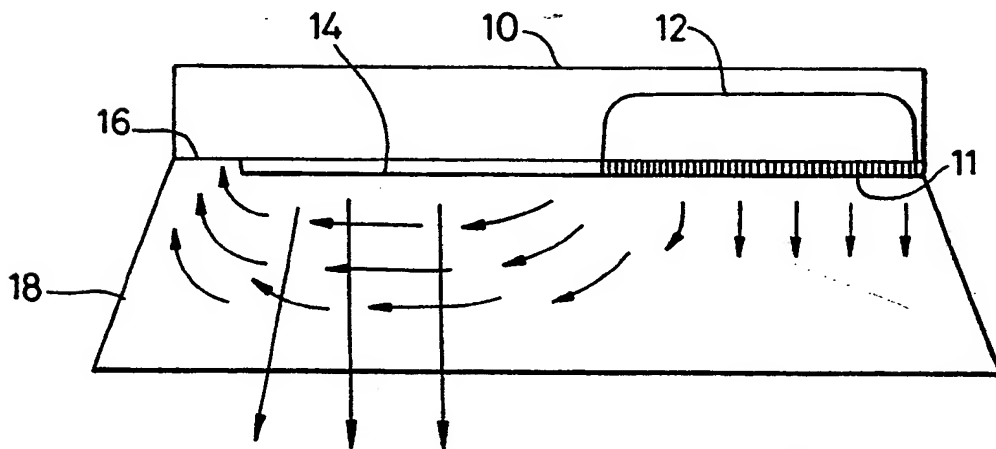
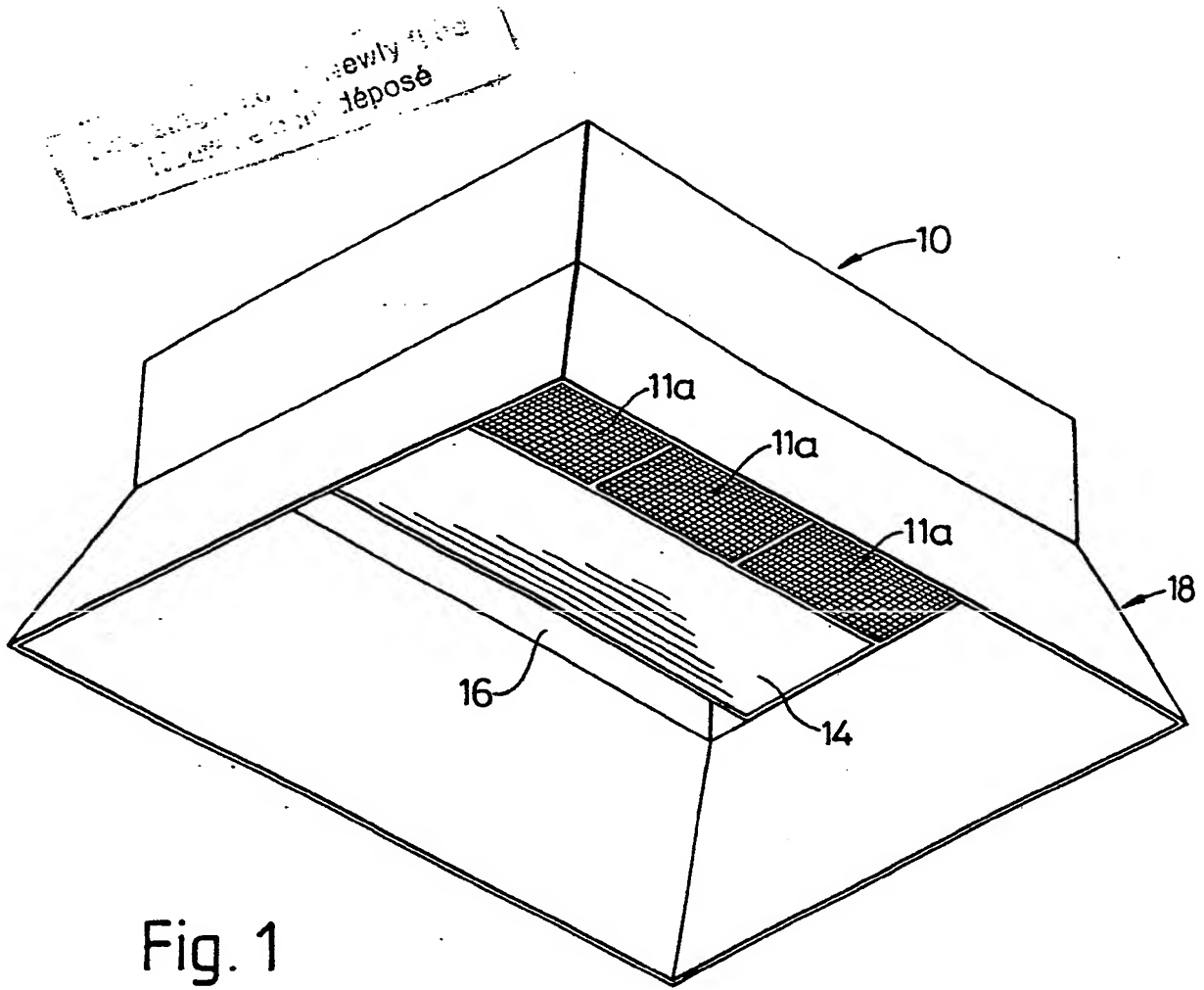
7. A heater as in any preceding claim characterised in that the secondary panels (14) are formed from a lightweight non-degradable, porous, fibrous or cellular material. 35

8. A heater as in Claim 7 characterised in that said material is a ceramic material. 40

9. A heater as in Claim 7 characterised in that said material comprises ceramic fibers, mineral wools, calcium silicate, amorphous silica, insulating firebrick, and/or porous ceramic tile. 45

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# EUROPEAN SEARCH REPORT

Application Number

EP 88 31 0474

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 359 965 (MILLIGAN) * Column 3, lines 5-20; column 4, lines 20-60; figures 1,5 *	1-5,7,8	F 24 C 1/10 F 24 C 3/04
X	DE-A-3 415 058 (KRAMER) * Page 6, lines 10-21; figure 1 *	1,2,4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			F 24 C F 23 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03-02-1989	Examiner VANHEUSDEN J.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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